

## REMARKS

Reexamination and reconsideration of this application is respectfully requested in light of foregoing amendments to the claims and the following remarks.

Claims 13, 14, and 22 are pending in the present application. Claim 21 has been cancelled. Claim 13 has been amended to include the  $\langle 100 \rangle$  orientation direction.

Applicant notes the Examiner's consideration of the information cited in the Information Disclosure Statement filed November 20, 2007, as acknowledged in the final Office Action Summary.

### Rejection Under 35 U.S.C. § 103

Claims 13, 14, 21 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 64-027197 in view of Okajima et al. (U.S. Patent No. 5,700,591). Claim 21 has been canceled, thereby rendering the rejection as to that claim moot. The Examiner concedes that neither reference discloses or suggests that  $\text{MgS}$  and  $\text{Mg}_{1-x}\text{Ca}_x\text{S}$  have the  $\langle 100 \rangle$  direction orientation. According to the Examiner, specifying the orientation direction is an “optimizable feature.” Applicant respectfully disagrees.

Normally, a crystal orientation plane is varied in different ways depending on the processing conditions and method used to making the crystal. For example, if the substrate temperature is varied in the process, a  $\langle 111 \rangle$  orientation will appear at a low substrate temperature and a  $\langle 110 \rangle$  orientation forms as the temperature of the substrate increases. At high temperature, a crystal having a  $\langle 100 \rangle$  orientation forms. The reason for this is that a crystal orientation plane with minimum energy is varied due to the interaction between a molecular vibration force caused by thermal energy and an electrical force of the Mg and S ions. There is

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no suggestion from the teachings of the references cited by the Examiner that the orientation of the first and second semiconductor would “prevent crystal lattice defects” when “the materials are subjected to a high electric field” as asserted in the Office Action. The crystal orientation in the present claimed invention increases emission intensity. There is no teaching or suggestion in either JP 64-027197 or Okajima et al. that would have led a person skilled in the art to expect such emission intensity, let alone that the first compound semiconductor and the second compound semiconductor having the same crystal orientation would lead to an increase in emission intensity.

The Examiner is requested to consider the publication by Mikami et al., “Chemical vapor deposition of ZnS:Mn electroluminescent films in a low-pressure halogen transport system,” *Journal of Crystal Growth*, 110 (1991) 381-394, cited in an Information Disclosure Statement submitted with this RCE Amendment. None of the prior art relied upon by the Examiner discloses crystallinity or crystal orientation for increasing the luminous intensity of MgCaS. At the time this application was filed, it was known that ZnS, which has a different crystal structure than MgCaS, a <111> orientation of ZnS was preferred in the art. The prior art did not recognize that a preferred crystal orientation of <100> would increase luminous intensity of MgCaS.

For all of the foregoing reasons, the combined teachings of JP 64-027197 and Okajima et al. would not have led a person skilled in the art to the claimed invention set forth in claims 13, 14 and 22. It is requested that the rejection be reconsidered and withdrawn.

### **Conclusion**

Favorable reconsideration of the claims is requested in light of the preceding amendments and remarks. Allowance of the claims is courteously solicited.

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If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicant's attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due under 37 C.F.R. § 1.17 and due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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